

Rec'd PCT/PTO 29 JUL 2005



SEQUENCE LISTING

<110>	Lonza Biologics plc.
<120>	Method of expressing recombinant protein in CHO cells
<130>	4145-22
<140>	10/521,768
<141>	2005-01-19
<150> <151>	·
	GB 0216648.6 2002-07-19
<160>	4
<170>	PatentIn version 3.1
<210>	1
<211>	6679
<212>	DNA
<213>	Hamster sp.
<220>	
<221>	misc_feature
<223>	Seq. ID. No. 4: circular plasmid GS vector p12.4 short mCMV-GFP \prime clone 3
<400>	1 attg atcataatca gccataccac atttgtagag gttttacttg ctttaaaaaa 60
	acac ctccccctga acctgaaaca taaaatgaat gcaattgttg ttgttaactt 120
	tgca gcttataatg gttacaaata aagcaatagc atcacaaatt tcacaaataa 180
	tttt tcactgcatt ctagttgtgg tttgtccaaa ctcatcaatg tatcttatca 240
	gegg cegegacetg caggegeaga actggtaggt atggaagate cetegagate 300



cattgtgctg gcggtaggcg agcagcgcct gcctgaagct gcgggcattc ccagtcagaa atgagegeca gtegtegteg geteteggea eegaagtget atgattetee geeageatgg cttcggccag tgcgtcgagc agcgcccgct tgttcctgaa gtgccagtaa agcgccggct gctgaacccc caaccgttcc gccagtttgc gtgtcgtcag accgtctacg ccgacctcgt tcaacaggtc cagggcggca cggatcactg tattcggctg caactttgtc atgcttgaca ctttatcact gataaacata atatgtccac caacttatca gtgataaaga atccgcgcca gcacaatgga tetegaggte gagggatete tagaggatee atattegegg geateaeegg cgccacaggt gcggttgctg gcgcctatat cgccgacatc accgatgggg aagatcgggc tcgccacttc gggctcatga gcgcttgttt cggcgtgggt atggtggcag gccccgtggc cgggggactg ttgggcgcca tctccttgca tgcaccattc cttgcggcgg cggtgctcaa eggeeteaac ctactactgg getgetteet aatgeaggag tegeataagg gagagegteg 1020 acctegggce gegttgetgg egttttteca taggeteege eeceetgaeg ageateacaa aaatcgacgc tcaagtcaga ggtggcgaaa cccgacagga ctataaagat accaggcgtt 1080 tecceetgga ageteceteg tgegetetee tgtteegace etgeegetta eeggatacet 1140 1200 gtccgccttt ctcccttcgg gaagcgtggc gctttctcat agctcacgct gtaggtatct 1260 cagttcggtg taggtcgttc gctccaagct gggctgtgtg cacgaacccc ccgttcagcc cgaccgctgc gccttatccg gtaactatcg tcttgagtcc aacccggtaa gacacgactt 1320 atcgccactg gcagcagcca ctggtaacag gattagcaga gcgaggtatg taggcggtgc 1380 tacagagttc ttgaagtggt ggcctaacta cggctacact agaagaacag tatttggtat 1440 ctgcgctctg ctgaagccag ttaccttcgg aaaaagagtt ggtagctctt gatccggcaa 1500 acaaaccacc gctggtagcg gtggtttttt tgtttgcaag cagcagatta cgcgcagaaa 1560 aaaaggatct caagaagatc ctttgatctt ttctacgggg tctgacgctc agtggaacga 1620 aaactcacgt taagggattt tggtcatgag attatcaaaa aggatcttca cctagatcct 1680 1740 tttaaattaa aaatgaagtt ttaaatcaat ctaaagtata tatgagtaaa cttggtctga 1800 cagttaccaa tgcttaatca gtgaggcacc tatctcagcg atctgtctat ttcgttcatc catagttgcc tgactcccg tcgtgtagat aactacgata cgggagggct taccatctgg 1860 ccccagtgct gcaatgatac cgcgagaccc acgctcaccg gctccagatt tatcagcaat 1920 aaaccagcca gccggaaggg ccgagcgcag aagtggtcct gcaactttat ccgcctccat 1980 ccagtctatt aattgttgcc gggaagctag agtaagtagt tcgccagtta atagtttgcg 2040 2100 caacgttgtt gccattgcta caggcatcgt ggtgtcacgc tcgtcgtttg gtatggcttc 2160 attcagctcc ggttcccaac gatcaaggcg agttacatga tcccccatgt tgtgcaaaaa ageggttage teetteggte etcegategt tgteagaagt aagttggeeg cagtgttate 2220

360

420

480

540 600

660

720

780

840

900

960

actcatggtt atggcagcac tgcataattc tcttactgtc atgccatccg taagatgctt 2280 ttctgtgact ggtgagtact caaccaagtc attctgagaa tagtgtatgc ggcgaccgag 2340 2400 ttgctcttgc ccggcgtcaa tacgggataa taccgcgcca catagcagaa ctttaaaagt gctcatcatt ggaaaacgtt cttcggggcg aaaactctca aggatcttac cgctgttgag 2460 atccagttcg atgtaaccca ctcgtgcacc caactgatct tcagcatctt ttactttcac 2520 cagcgtttct gggtgagcaa aaacaggaag gcaaaatgcc gcaaaaaagg gaataagggc 2580 gacacggaaa tgttgaatac tcatactctt cctttttcaa tattattgaa gcatttatca 2640 gggttattgt ctcatgagcg gatacatatt tgaatgtatt tagaaaaata aacaaatagg 2700 ggttccgcgc acatttcccc gaaaagtgcc acctgacgtc taagaaacca ttattatcat 2760 2820 gacattaacc tataaaaata ggcgtatcac gaggccctga tggctctttg cggcacccat cgttcgtaat gttccgtggc accgaggaca accctcaaga gaaaatgtaa tcacactggc 2880 tcaccttcgg gtgggccttt ctgcgtttat aaggagacac tttatgttta agaaggttgg 2940 3000 taaattcctt gcggctttgg cagccaagct agatccggct gtggaatgtg tgtcagttag 3060 ggtgtggaaa gtccccaggc tccccagcag gcagaagtat gcaaagcatg catctcaatt agtcagcaac caggtgtgga aagtccccag gctccccagc aggcagaagt atgcaaagca 3120 tgcatctcaa ttagtcagca accatagtcc cgcccctaac tccgcccatc ccgcccctaa 3180 ctccgcccag ttccgcccat tctccgcccc atggctgact aattttttt atttatgcag 3240 aggccgaggc cgcctcggcc tctgagctat tccagaagta gtgaggaggc ttttttggag 3300 gcctaggctt ttgcaaaaag ctagcttggg gccaccgctc agagcacctt ccaccatggc 3360 3420 cacctcagca agttcccact tgaacaaaaa catcaagcaa atgtacttgt gcctgcccca gggtgagaaa gtccaagcca tgtatatctg ggttgatggt actggagaag gactgcgctg 3480 caaaacccgc accctggact gtgagcccaa gtgtgtagaa gagttacctg agtggaattt 3540 tgatggctct agtacctttc agtctgaggg ctccaacagt gacatgtatc tcagccctgt 3600 tgccatgttt cgggacccct tccgcagaga tcccaacaag ctggtgttct gtgaagtttt 3660 3720 caagtacaac cggaagcctg cagagaccaa tttaaggcac tcgtgtaaac ggataatgga 3780 catggtgagc aaccagcacc cctggtttgg aatggaacag gagtatactc tgatgggaac agatgggcac cettttggtt ggcettecaa tggettteet gggeeecaag gteegtatta 3840 3900 ctgtggtgtg ggcgcagaca aagcctatgg cagggatatc gtggaggctc actaccgcgc ctgcttgtat gctggggtca agattacagg aacaaatgct gaggtcatgc ctgcccagtg 3960 ggaactccaa ataggaccct gtgaaggaat ccgcatggga gatcatctct gggtggcccg 4020 tttcatcttg catcgagtat gtgaagactt tggggtaata gcaacctttg accccaagcc 4080

4140 cattcctggg aactggaatg gtgcaggctg ccataccaac tttagcacca aggccatgcg 4200 ggaggagaat ggtctgaagc acatcgagga ggccatcgag aaactaagca agcggcaccg gtaccacatt cgagcctacg atcccaaggg gggcctggac aatgcccgtg gtctgactgg 4260 4320 gttccacgaa acgtccaaca tcaacgactt ttctgctggt gtcgccaatc gcagtgccag 4380 catccgcatt ccccggactg tcggccagga gaagaaaggt tactttgaag accgcggccc ctctgccaat tgtgacccct ttgcagtgac agaagccatc gtccgcacat gccttctcaa 4440 tgagactggc gacgagccct tccaatacaa aaactaatta gactttgagt gatcttgagc 4500 ctttcctagt tcatcccacc ccgccccaga gagatctttg tgaaggaacc ttacttctgt 4560 4620 ggtgtgacat aattggacaa actacctaca gagatttaaa gctctaaggt aaatataaaa tttttaagtg tataatgtgt taaactactg attctaattg tttgtgtatt ttagattcca 4680 4740 acctatggaa ctgatgaatg ggagcagtgg tggaatgcct ttaatgagga aaacctgttt 4800 tgctcagaag aaatgccatc tagtgatgat gaggctactg ctgactctca acattctact cctccaaaaa agaagagaaa ggtagaagac cccaaggact ttccttcaga attgctaagt 4860 4920 tttttgagtc atgctgtgtt tagtaataga actcttgctt gctttgctat ttacaccaca aaggaaaaag ctgcactgct atacaagaaa attatggaaa aatattctgt aacctttata 4980 agtaggcata acagttataa tcataacata ctgttttttc ttactccaca caggcataga 5040 gtgtctgcta ttaataacta tgctcaaaaa ttgtgtacct ttagcttttt aatttgtaaa 5100 ggggttaata aggaatattt gatgtatagt gccttgacta gagatcataa tcagccatac 5160 cacatttgta gaggttttac ttgctttaaa aaacctccca cacctcccc tgaacctgaa 5220 acataaaatg aatgcaattg ttgttgttaa cttgtttatt gcagcttata atggttacaa 5280 ataaagcaat agcatcacaa atttcacaaa taaagcattt ttttcactgc attctagttg 5340 tggtttgtcc aaactcatca atgtatctta tcatgtctgg atctctagct tcgtgtcaag 5400 gacggtgagg cgcgcctact gagtcattag ggactttcca atgggttttg cccagtacat 5460 aaggtcaata ggggtgaatc aacaggaaag tcccattgga gccaagtaca ctgagtcaat 5520 agggactttc cattgggttt tgcccagtac aaaaggtcaa tagggggtga gtcaatgggt 5580 ttttcccatt attggcacgt acataaggtc aataggggtg agtcattggg tttttccagc 5640 caatttaatt aaaacgccat gtactttccc accattgacg tcaatgggct attgaaacta 5700 atgcaacgtg acctttaaac ggtactttcc catagctgat taatgggaaa gtaccgttct 5760 cgagccaata cacgtcaatg ggaagtgaaa gggcagccaa aacgtaacac cgccccggtt 5820 ttcccctgga aattccatat tggcacgcat tctattggct gagctgcgtt ctacgtgggt 5880 ataagaggcg cgaccagcgt cggtaccgtc gcagtcttcg gtctgaccac cgtagaacgc 5940 agaagcttgc cgccaccatg gtgagcaagc agatcctgaa gaacaccggc ctgcaggaga 6000

tcatgagett caaggtgaac etggagggeg tggtgaacaa ecaegtgtte accatggagg 6060 gctgcggcaa gggcaacatc ctgttcggca accagctggt gcagatccgc gtgaccaagg 6120 gegeeecet geeettegee ttegacatee tgageeeege etteeagtae ggeaacegea 6180 6240 cetteaceaa gtaceegag gacateageg acttetteat ceagagette eeegeegget tegtgtacga gegeaccetg egetacgagg aeggeggeet ggtggagate egeagegaca 6300 6360 tcaacctgat cgaggagatg ttcgtgtacc gcgtggagta caagggccgc aacttcccca acgacggccc cgtgatgaag aagaccatca ccggcctgca gcccagcttc gaggtggtgt 6420 acatgaacga cggcgtgctg gtgggccagg tgatcctggt gtaccgcctg aacagcggca 6480 agttctacag ctgccacatg cgcaccctga tgaagagcaa gggcgtggtg aaggacttcc 6540 6600 ccgagtacca cttcatccag caccgcctgg agaagaccta cgtggaggac ggcggcttcg tggagcagca cgagaccgcc atcgcccagc tgaccagcct gggcaagccc ctgggcagcc 6660 tgcacgagtg ggtgtaata 6679

<210> 2

<211> 8251

<212> DNA

<213> Hamster sp.

<220>

<221> misc_feature

<223> Seq. ID. No. 3: circular plasmid GS vector p12.4 hCMVp-GFP /clone 13

<400> 2 gaattcattg atcataatca gccataccac atttgtagag gttttacttg ctttaaaaaa 60 cctcccacac ctcccctga acctgaaaca taaaatgaat gcaattgttg ttgttaactt 120 gtttattgca gcttataatg gttacaaata aagcaatagc atcacaaatt tcacaaataa 180 240 agcatttttt tcactgcatt ctagttgtgg tttgtccaaa ctcatcaatg tatcttatca tgtctggcgg ccgcgacctg caggcgcaga actggtaggt atggaagatc cctcgagatc 300 cattgtgctg gcggtaggcg agcagcgcct gcctgaagct gcgggcattc ccagtcagaa 360 atgagegeca gtegtegteg geteteggea eegaagtget atgattetee geeageatgg 420 cttcggccag tgcgtcgagc agcgcccgct tgttcctgaa gtgccagtaa agcgccggct 480 540 gctgaacccc caaccgttcc gccagtttgc gtgtcgtcag accgtctacg ccgacctcgt

5.

600 tcaacaggtc cagggcggca cggatcactg tattcggctg caactttgtc atgcttgaca ctttatcact gataaacata atatgtccac caacttatca gtgataaaga atccgcgcca 660 gcacaatgga tctcgaggtc gagggatctc tagaggatcc atattcgcgg gcatcaccgg 720 780 cgccacaggt gcggttgctg gcgcctatat cgccgacatc accgatgggg aagatcgggc tegecactte gggeteatga gegettgttt eggegtgggt atggtggeag geecegtgge 840 cgggggactg ttgggcgcca tctccttgca tgcaccattc cttgcggcgg cggtgctcaa 900 960 eggeeteaac ctactactgg getgetteet aatgeaggag tegeataagg gagagegteg acctegggce gegttgetgg egttttteca taggeteege ecceetgaeg ageateacaa 1020 aaatcgacgc tcaagtcaga ggtggcgaaa cccgacagga ctataaagat accaggcgtt 1080 tececetgga ageteceteg tgegetetee tgtteegace etgeegetta eeggataeet 1140 gtccgccttt ctcccttcgg gaagcgtggc gctttctcat agctcacgct gtaggtatct 1200 1260 cagttcggtg taggtcgttc gctccaagct gggctgtgtg cacgaacccc ccgttcagcc cgaccgctgc gccttatccg gtaactatcg tcttgagtcc aacccggtaa gacacgactt 1320 ategecactg geageageca etggtaacag gattageaga gegaggtatg taggeggtge 1380 tacagagttc ttgaagtggt ggcctaacta cggctacact agaagaacag tatttggtat 1440 ctgcgctctg ctgaagccag ttaccttcgg aaaaagagtt ggtagctctt gatccggcaa 1500 1560 acaaaccacc gctggtagcg gtggtttttt tgtttgcaag cagcagatta cgcgcagaaa aaaaggatct caagaagatc ctttgatctt ttctacgggg tctgacgctc agtggaacga 1620 1680 aaactcacgt taagggattt tggtcatgag attatcaaaa aggatcttca cctagatcct tttaaattaa aaatgaagtt ttaaatcaat ctaaagtata tatgagtaaa cttggtctga 1740 cagttaccaa tgcttaatca gtgaggcacc tatctcagcg atctgtctat ttcgttcatc 1800 catagttgcc tgactccccg tcgtgtagat aactacgata cgggagggct taccatctgg 1860 1920 ccccagtgct gcaatgatac cgcgagaccc acgctcaccg gctccagatt tatcagcaat 1980 aaaccagcca gccggaaggg ccgagcgcag aagtggtcct gcaactttat ccgcctccat ccagtctatt aattgttgcc gggaagctag agtaagtagt tcgccagtta atagtttgcg 2040 caacgttgtt gccattgcta caggcatcgt ggtgtcacgc tcgtcgtttg gtatggcttc 2100 2160 attcagctcc ggttcccaac gatcaaggcg agttacatga tcccccatgt tgtgcaaaaa 2220 ageggttage teetteggte etcegategt tgteagaagt aagttggeeg cagtgttate actcatggtt atggcagcac tgcataattc tcttactgtc atgccatccg taagatgctt 2280 ttctgtgact ggtgagtact caaccaagtc attctgagaa tagtgtatgc ggcgaccgag 2340 ttgctcttgc ccggcgtcaa tacgggataa taccgcgcca catagcagaa ctttaaaagt 2400

gctcatcatt ggaaaacgtt cttcggggcg aaaactctca aggatcttac cgctgttgag 2460 atccagttcg atgtaaccca ctcgtgcacc caactgatct tcagcatctt ttactttcac 2520 2580 cagcgtttct gggtgagcaa aaacaggaag gcaaaatgcc gcaaaaaagg gaataagggc gacacggaaa tgttgaatac tcatactctt cctttttcaa tattattgaa gcatttatca 2640 2700 gggttattgt ctcatgagcg gatacatatt tgaatgtatt tagaaaaata aacaaatagg ggttccgcgc acatttcccc gaaaagtgcc acctgacgtc taagaaacca ttattatcat 2760 gacattaacc tataaaaata ggcgtatcac gaggccctga tggctctttg cggcacccat 2820 2880 cgttcgtaat gttccgtggc accgaggaca accctcaaga gaaaatgtaa tcacactggc tcaccttcgg gtgggccttt ctgcgtttat aaggagacac tttatgttta agaaggttgg 2940 taaattcctt gcggctttgg cagccaagct agatccggct gtggaatgtg tgtcagttag 3000 ggtgtggaaa gtccccaggc tccccagcag gcagaagtat gcaaagcatg catctcaatt 3060 3120 agtcagcaac caggtgtgga aagtccccag gctccccagc aggcagaagt atgcaaagca tgcatctcaa ttagtcagca accatagtcc cgcccctaac tccgcccatc ccgcccctaa 3180 ctccgcccag ttccgcccat tctccgcccc atggctgact aattttttt atttatgcag 3240 aggecgagge egeeteggee tetgagetat teeagaagta gtgaggagge ttttttggag 3300 gcctaggctt ttgcaaaaag ctagcttggg gccaccgctc agagcacctt ccaccatggc 3360 cacctcagca agttcccact tgaacaaaaa catcaagcaa atgtacttgt gcctgcccca 3420 3480 gggtgagaaa gtccaagcca tgtatatctg ggttgatggt actggagaag gactgcgctg 3540 caaaacccgc accetggact gtgagcccaa gtgtgtagaa gagttacctg agtggaattt tgatggctct agtacctttc agtctgaggg ctccaacagt gacatgtatc tcagccctgt 3600 tgccatgttt cgggacccct tccgcagaga tcccaacaag ctggtgttct gtgaagtttt 3660 caagtacaac cggaagcctg cagagaccaa tttaaggcac tcgtgtaaac ggataatgga 3720 catggtgagc aaccagcacc cctggtttgg aatggaacag gagtatactc tgatgggaac 3780 agatgggcac cettttggtt ggccttccaa tggctttcct gggccccaag gtccgtatta 3840 3900 ctgtggtgtg ggcgcagaca aagcctatgg cagggatatc gtggaggctc actaccgcgc ctgcttgtat gctggggtca agattacagg aacaaatgct gaggtcatgc ctgcccagtg 3960 4020 ggaactccaa ataggaccct gtgaaggaat ccgcatggga gatcatctct gggtggcccg 4080 tttcatcttg catcgagtat gtgaagactt tggggtaata gcaacctttg accccaagcc cattcctggg aactggaatg gtgcaggctg ccataccaac tttagcacca aggccatgcg 4140 ggaggagaat ggtctgaagc acatcgagga ggccatcgag aaactaagca agcggcaccg 4200 gtaccacatt cgagcctacg atcccaaggg gggcctggac aatgcccgtg gtctgactgg 4260 gttccacgaa acgtccaaca tcaacgactt ttctgctggt gtcgccaatc gcagtgccag 4320

4380 catcogcatt coccggactg tcggccagga gaagaaaggt tactttgaag accgcggccc ctctgccaat tgtgacccct ttgcagtgac agaagccatc gtccgcacat gccttctcaa 4440 4500 tgagactggc gacgagccct tccaatacaa aaactaatta gactttgagt gatcttgagc 4560 ctttcctagt tcatcccacc ccgccccaga gagatctttg tgaaggaacc ttacttctgt ggtgtgacat aattggacaa actacctaca gagatttaaa gctctaaggt aaatataaaa 4620 4680 tttttaagtg tataatgtgt taaactactg attctaattg tttgtgtatt ttagattcca 4740 acctatggaa ctgatgaatg ggagcagtgg tggaatgcct ttaatgagga aaacctgttt 4800 tgctcagaag aaatgccatc tagtgatgat gaggctactg ctgactctca acattctact cctccaaaaa agaagagaaa ggtagaagac cccaaggact ttccttcaga attgctaagt 4860 4920 tttttgagtc atgctgtgtt tagtaataga actcttgctt gctttgctat ttacaccaca 4980 aaggaaaaag ctgcactgct atacaagaaa attatggaaa aatattctgt aacctttata agtaggcata acagttataa tcataacata ctgttttttc ttactccaca caggcataga 5040 5100 gtgtctgcta ttaataacta tgctcaaaaa ttgtgtacct ttagcttttt aatttgtaaa 5160 ggggttaata aggaatattt gatgtatagt gccttgacta gagatcataa tcagccatac 5220 cacatttgta gaggttttac ttgctttaaa aaacctccca cacctcccc tgaacctgaa 5280 acataaaatg aatgcaattg ttgttgttaa cttgtttatt gcagcttata atggttacaa ataaagcaat agcatcacaa atttcacaaa taaagcattt ttttcactgc attctagttg 5340 tggtttgtcc aaactcatca atgtatctta tcatgtctgg atctagcttc gtgtcaagga 5400 cggtgactgc agtgaataat aaaatgtgtg tttgtccgaa atacgcgttt tgagatttct 5460 gtcgccgact aaattcatgt cgcgcgatag tggtgtttat cgccgataga gatggcgata 5520 5580 ttggaaaaat cgatatttga aaatatggca tattgaaaat gtcgccgatg tgagtttctg tgtaactgat atcgccattt ttccaaaagt gatttttggg catacgcgat atctggcgat 5640 5700 agegettata tegtttaegg gggatggega tagaegaett tggtgaettg ggegattetg tgtgtcgcaa atatcgcagt ttcgatatag gtgacagacg atatgaggct atatcgccga 5760 tagaggcgac atcaagctgg cacatggcca atgcatatcg atctatacat tgaatcaata 5820 5880 ttggccatta gccatattat tcattggtta tatagcataa atcaatattg gctattggcc attgcatacg ttgtatccat atcataatat gtacatttat attggctcat gtccaacatt 5940 accgccatgt tgacattgat tattgactag ttattaatag taatcaatta cggggtcatt 6000 agttcatagc ccatatatgg agttccgcgt tacataactt acggtaaatg gcccgcctgg 6060 ctgaccgccc aacgaccccc gcccattgac gtcaataatg acgtatgttc ccatagtaac 6120 gccaataggg actttccatt gacgtcaatg ggtggagtat ttacggtaaa Ctgcccactt 6180

ggcagtacat caagtgtatc atatgccaag tacgcccct attgacgtca atgacggtaa atggcccgcc tggcattatg cccagtacat gaccttatgg gactttccta cttggcagta catctacgta ttagtcatcg ctattaccat ggtgatgcgg ttttggcagt acatcaatgg gcgtggatag cggtttgact cacggggatt tccaagtctc caccccattg acgtcaatgg gagtttgttt tggcaccaaa atcaacggga ctttccaaaa tgtcgtaaca actccgcccc attgacgcaa atgggcggta ggcgtgtacg gtgggaggtc tatataagca gagctcgttt agtgaaccgt cagatcgcct ggagacgcca tccacgctgt tttgacctcc atagaagaca ccgggaccga tccagcctcc gcggccggga acggtgcatt ggaacgcgga ttccccgtgc caagagtgac gtaagtaccg cctatagagt ctataggccc accccttgg cttcttatgc atgetataet gtttttgget tggggtetat acaccecege tteeteatgt tataggtgat ggtatagctt agcctatagg tgtgggttat tgaccattat tgaccactcc cctattggtg acgatacttt ccattactaa tccataacat ggctctttgc cacaactctc tttattggct atatgccaat acactgtcct tcagagactg acacggactc tgtattttta caggatgggg totcatttat tatttacaaa ttcacatata caacaccacc gtccccagtg cccgcagttt ttattaaaca taacgtggga tctccacgcg aatctcgggt acgtgttccg gacatgggct cttctccggt agcggcggag cttctacatc cgagccctgc tcccatgcct ccagcgactc atggtcgctc ggcagctcct tgctcctaac agtggaggcc agacttaggc acagcacgat gcccaccacc accagtgtgc cgcacaaggc cgtggcggta gggtatgtgt Ctgaaaatga gctcggggag cgggcttgca ccgctgacgc atttggaaga cttaaggcag cggcagaaga agatgcaggc agctgagttg ttgtgttctg ataagagtca gaggtaactc ccgttgcggt gctgttaacg gtggagggca gtgtagtctg agcagtactc gttgctgccg cgcgccac cagacataat agctgacaga ctaacagact gttcctttcc atgggtcttt tctgcagtca ccgtccttga cacgaagctt gccgccacca tggtgagcaa gcagatcctg aagaacaccg gcctgcagga gatcatgagc ttcaaggtga acctggaggg cgtggtgaac aaccacgtgt tcaccatgga gggctgcggc aagggcaaca tcctgttcgg caaccagctg gtgcagatcc gcgtgaccaa gggcgccccc ctgcccttcg ccttcgacat cctgagcccc gccttccagt acggcaaccg caccttcacc aagtaccccg aggacatcag cgacttcttc atccagagct teccegeegg ettegtgtae gagegeacee tgegetaega ggaeggegge etggtggaga tccgcagcga catcaacctg atcgaggaga tgttcgtgta ccgcgtggag tacaagggcc gcaacttccc caacgacggc cccgtgatga agaagaccat caccggcctg Cagcccagct tcgaggtggt gtacatgaac gacggcgtgc tggtgggcca ggtgatcctg gtgtaccgcc tgaacagcgg caagttctac agctgccaca tgcgcaccct gatgaagagc aagggcgtgg

6300

6360

6420

6480

6540

6600

6660

6720

6780

6840

6900

6960

7020

7080

7140

7200

7260

7320

7380

7440

7500

7560

7620 7680

7740

7800

7860

7920

7980

8040 8100 tgaaggactt ccccgagtac cacttcatcc agcaccgcct ggagaagacc tacgtggagg 8160
acggcggctt cgtggagcag cacgagaccg ccatcgccca gctgaccagc ctgggcaagc 8220
ccctgggcag cctgcacgag tgggtgtaat a 8251

<210> 3

<211> 10369

<212> DNA

<213> Hamster sp.

<220>

<221> misc_feature

<223> Seq. ID. No. 2: circular plasmid GS-minigene vector p 14.4 DeltaM
 odulator (mod-) hCMVp-GFP /clone 6

<400> 3 60 gaattcattg atcataatca gccataccac atttgtagag gttttacttg ctttaaaaaa 120 cctcccacac ctcccctga acctgaaaca taaaatgaat gcaattgttg ttgttaactt gtttattgca gcttataatg gttacaaata aagcaatagc atcacaaatt tcacaaataa 180 240 agcatttttt tcactgcatt ctagttgtgg tttgtccaaa ctcatcaatg tatcttatca 300 tgtctggcgg ccgcgacctg caggcgcaga actggtaggt atggaagatc cctcgagatc 360 cattgtgctg gcggtaggcg agcagcgcct gcctgaagct gcgggcattc ccagtcagaa 420 atgagegeca gtegtegteg geteteggea eegaagtget atgattetee geeageatgg 480 cttcggccag tgcgtcgagc agcgcccgct tgttcctgaa gtgccagtaa agcgccggct gctgaacccc caaccgttcc gccagtttgc gtgtcgtcag accgtctacg ccgacctcgt 540 tcaacaggtc cagggcggca cggatcactg tattcggctg caactttgtc atgcttgaca 600 660 ctttatcact gataaacata atatgtccac caacttatca gtgataaaga atccgcgcca 720 gcacaatgga tctcgaggtc gagggatctc tagaggatcc atattcgcgg gcatcaccgg 780 cgccacaggt gcggttgctg gcgcctatat cgccgacatc accgatgggg aagatcgggc tegecaette gggeteatga gegettgttt eggegtgggt atggtggeag geecegtgge 840 cgggggactg ttgggcgcca tctccttgca tgcaccattc cttgcggcgg cggtgctcaa 900 960 eggeeteaac ctactactgg getgetteet aatgeaggag tegeataagg gagagegteg acctegggee gegttgetgg egttttteea taggeteege eeceetgaeg ageateacaa 1020 1080 aaatcgacgc tcaagtcaga ggtggcgaaa cccgacagga ctataaagat accaggcgtt

tececetgga ageteceteg tgegetetee tgtteegace etgeegetta eeggataeet gtccgccttt ctcccttcgg gaagcgtggc gctttctcat agctcacgct gtaggtatct 1200 1260 cagttcggtg taggtcgttc gctccaagct gggctgtgtg cacgaacccc ccgttcagcc 1320 cgaccgctgc gccttatccg gtaactatcg tcttgagtcc aacccggtaa gacacgactt atcgccactg gcagcagcca ctggtaacag gattagcaga gcgaggtatg taggcggtgc 1380 tacagagttc ttgaagtggt ggcctaacta cggctacact agaagaacag tatttggtat 1440 ctgcgctctg ctgaagccag ttaccttcgg aaaaagagtt ggtagctctt gatccggcaa 1500 1560 acaaaccacc gctggtagcg gtggtttttt tgtttgcaag cagcagatta cgcgcagaaa 1620 aaaaggatct caagaagatc ctttgatctt ttctacgggg tctgacgctc agtggaacga 1680 aaactcacgt taagggattt tggtcatgag attatcaaaa aggatcttca cctagatcct tttaaattaa aaatgaagtt ttaaatcaat ctaaagtata tatgagtaaa cttggtctga 1740 1800 cagttaccaa tgcttaatca gtgaggcacc tatctcagcg atctgtctat ttcgttcatc catagttgcc tgactccccg tcgtgtagat aactacgata cgggagggct taccatctgg 1860 ccccagtgct gcaatgatac cgcgagaccc acgctcaccg gctccagatt tatcagcaat 1920 1980 aaaccagcca gccggaaggg ccgagcgcag aagtggtcct gcaactttat ccgcctccat ccagtctatt aattgttgcc gggaagctag agtaagtagt tcgccagtta atagtttgcg 2040 2100 caacgttgtt gccattgcta caggcatcgt ggtgtcacgc tcgtcgtttg gtatggcttc 2160 attcagetce ggtteceaac gateaaggeg agttacatga tececeatgt tgtgcaaaaa 2220 ageggttage teetteggte etcegategt tgteagaagt aagttggeeg cagtgttate actcatggtt atggcagcac tgcataattc tcttactgtc atgccatccg taagatgctt 2280 ttctgtgact ggtgagtact caaccaagtc attctgagaa tagtgtatgc ggcgaccgag 2340 2400 ttgctcttgc ccggcgtcaa tacgggataa taccgcgcca catagcagaa ctttaaaagt 2460 gctcatcatt ggaaaacgtt cttcggggcg aaaactctca aggatcttac cgctgttgag 2520 atccagttcg atgtaaccca ctcgtgcacc caactgatct tcagcatctt ttactttcac 2580 cagcgtttct gggtgagcaa aaacaggaag gcaaaaatgcc gcaaaaaaagg gaataagggc gacacggaaa tgttgaatac tcatactctt cctttttcaa tattattgaa gcatttatca 2640 2700 gggttattgt ctcatgagcg gatacatatt tgaatgtatt tagaaaaaata aacaaatagg 2760 ggttccgcgc acatttcccc gaaaagtgcc acctgacgtc taagaaacca ttattatcat gacattaacc tataaaaata ggcgtatcac gaggccctga tggctctttg cggcacccat 2820 2880 cgttcgtaat gttccgtggc accgaggaca accctcaaga gaaaatgtaa tcacactggc tcaccttcgg gtgggccttt ctgcgtttat aaggagacac tttatgttta agaaggttgg 2940

3000 taaatteett geggetttgg eageeaaget agateeaget ttttgeaaaa geetaggeet ccaaaaaagc ctcctcacta cttctggaat agctcagagg ccgaggcggc ctcggcctct 3060 gcataaataa aaaaaattag tcagccatgg ggcggagaat gggcggaact gggcggagtt 3120 aggggcggga tgggcggagt taggggcggg actatggttg ctgactaatt gagatgcatg 3180 ctttgcatac ttctgcctgc tggggagcct ggggactttc cacacctggt tgctgactaa 3240 ttgagatgca tgctttgcat acttctgcct gctggggagc ctgggggactt tccacaccct 3300 3360 aactgacaca cattccacag ggaagctagc ttggaattaa ttccccgccc ccttccaata 3420 caaaaactaa ttagactttg agtgatcttg agcctttcct agtttttgta ttggaagggc tcgtcgccag tctcattgag aaggcatgtg cggacgatgg cttctgtcac tgcaaagggg 3480 3540 3600 aatgggagta gagccgactg cttgattccc acaccaatct cctcgccgct ctcacttcgc ctcgttctcg tggctcgtgg ccctgtccac cccgtccatc atcccgccgg ccaccgctca 3660 3720 gagcaccttc caccatggcc acctcagcaa gttcccactt gaacaaaaac atcaagcaaa 3780 tgtacttgtg cctgcccag ggtgagaaag tccaagccat gtatatctgg gttgatggta 3840 ctggagaagg actgcgctgc aaaacccgca ccctggactg tgagcccaag tgtgtagaag agttacctga gtggaatttt gatggctcta gtacctttca gtctgagggc tccaacagtg 3900 acatgtatct cagccctgtt gccatgtttc gggacccctt ccgcagagat cccaacaagc 3960 4020 tggtgttctg tgaagttttc aagtacaacc ggaagcctgc agagaccaat ttaaggcact 4080 cgtgtaaacg gataatggac atggtgagca accagcaccc ctggttttgga atggaacagg 4140 agtatactct gatgggaaca gatgggcacc cttttggttg gccttccaat ggctttcctg 4200 qqccccaaqq tccqtattac tgtggtgtgg gcgcagacaa agcctatggc agggatatcg tggaggctca ctaccgcgcc tgcttgtatg ctggggtcaa gattacagga acaaatgctg 4260 aggtcatgcc tgcccagtgg gaactccaaa taggaccctg tgaaggaatc cgcatgggag 4320 atcatctctg ggtggcccgt ttcatcttgc atcgagtatg tgaagacttt ggggtaatag 4380 4440 caacctttga ccccaagccc attcctggga actggaatgg tgcaggctgc cataccaact 4500 ttagcaccaa ggccatgcgg gaggagaatg gtctgaagta agtagctccc tctggaccat 4560 ctttattctc atggggtgga aggcctttgt gttagggttg ggaaaagttg gacttctcac 4620 aaactacatg ccatgctctt cgtgtttgtc ataagcctat cgttttgtac ccgttggaga 4680 agtgacagta ctctaggaat agaattacag ctgtgatatg ggaaagttgt cacgtaggtt 4740 caagcattta aaggtettta gtaagaacta aatacacata caagcaagtg ggtgaettaa ttcttactga tgggaagagg ccagtgatgg gggtcttccc atccaaaaga taattggtat 4800 tacatgttga ggactggtct gaagcacttg agacataggt cacaaggcag acacagcctg 4860

4920 catcaagtat ttattggttt cttatggaac tcatgcctgc tcctgccctt gaaggacagg tttctagtga caaggtcaga ccctcacctt tactgcttcc accaggcaca tcgaggaggc 4980 5040 catcgagaaa ctaagcaagc ggcaccggta ccacattcga gcctacgatc ccaagggggg gctggacaat gcccgtggtc tgactgggtt ccacgaaacg tccaacatca acgacttttc 5100 tgctggtgtc gccaatcgca gtgccagcat ccgcattccc cggactgtcg gccaggagaa 5160 5220 gaaaggttac tttgaagacc gccgccctc tgccaattgt gacccctttg cagtgacaga 5280 agccatcgtc cgcacatgcc ttctcaatga gactggcgac gagcccttcc aatacaaaaa ctaattagac tttgagtgat cttgagcctt tcctagttca tgccaccccg ccccagctgt 5340 ctcattgtaa ctcaaaggat ggaatatcaa cggtcttttt attcctcgtg cccagttaat 5400 5460 ccttgctttt attggtcaga atagaggagt caagttctta atgcctatac accaacctca 5520 tttcttttct atttagcttt ctacgtgggg gtgggagggg tagggagggg taggcgaagg gaacgtaacc acatgcttca tctcatcagg aatgccatgt ccagtaggca gagctgccac 5580 agagtgggtg tatttgtgga ggaggacttt ttcttcagga cagttaaaag agcaggtcca 5640 5700 ctgcttggat tgacaattcc cctataggta gagagcttgc tagttcttca ggtaaaccaa 5760 ctttctattc caaatggaag ttaggtgagg agtagtggag gagttaatgc cctccatgaa 5820 gacageteag tgtateacet gagacagatg ggtageeeta etgtaaaaga aggaaaagtt atttctgggt cctccattta taacacaaag cagtagtatt tttatattta aatgtaaaaa 5880 caaaagttat atatatgata tgtggatata tgtgtatttc taattcagaa accatcctag 5940 ttactgggtt tgccaagttt gaagagcttg gttaacaaga aaggatctct tgagtagagg 6000 tgggggtgca gtaccaggaa aggtggttat ctggggctca gcgctttatt actatgtggg 6060 6120 gtttcccctg cccactctgc aggagcagat gctggacagg tagcagggtg ggacaccagt gcttgccacc acctgtccct gtgcttaggc taagatgcat atgtatccac acagagttag 6180 6240 caggatggag ttggctggtc aacttgaaca ttgttactga taggggtggg tggggtttat tttttggtgg gactagcatg tcactaaagc aggccttttg atatattaaa ttttttaaag 6300 caaaacaagt tcagctttta atcaactttg tagggtttct aactttacag aattgcctgt 6360 6420 ttgtttcagt gtctccatcc actttgctct tggaggaacg gaggacaggc agacctggag ttaaaacatt tgtcattttg tgtcatagtg tctactttct cccagcagaa tattcctttc 6480 cttcttagga gtcctatgga gttttgtttt tgtttttttt ctattacgat aaacataccc 6540 6600 cacctccatt ctggcttgcc ctgctgttct ctggttgttt gtgtgctgtc cgcagcaggc tgcctgtggt tttctcttgc catgacgact tctaattgcc atgtacagta tgttcagtta 6660 gataactcct cattgtaaac agactgtaac tgccagagca gcgcttataa atcaacctaa 6720

6780 6840 gcgtgcagta tttttttgtt ccttcatttc ctatcaaaag aaaggggagt ggttctgttt 6900 tgtttactcg caaaataagc tagcttatct attggctttt ctttttttt ttttttaa 6960 acgggctttt tcttgtacct ataatttggg gtaaggtgtg agagttttta tagttttttg agacagggtc ttggtgtata cccttggctg gcctggagct aactatgtag actgggctag 7020 cctttaactt gcagttctgc tttcaattag ggtttataca tttagtcttg gcaattccta 7080 7140 gttccacgtt taatctcttt acatttcaaa gcagtgttat ctgaagagtt caggcgcaga 7200 gtcaattcaa tagagttaca caaaaaccta aaaaacaagt tttaaatacc aagttatgtt ggcctggcca cttttcacag ctgtccacaa ctcaatgtga caaggctaca aattggatat 7260 actagaattt cctggtgatt tggaacccct gcttcatttc ccggaaccag ggcttttggt 7320 gacagtecta gettateaga ttatttaaaa eagttaetet teetgeeett etteetgaga 7380 7440 cctttgtcca gctgccatga gccatctaca cagtacttgc ttccctgttg aagtcactga 7500 aggcacatca gcccaagaca taaaggcttg tcccggattc actagcctgg tgaacttgtg 7560 gttctctgat gttttgtcct gttttgttgt gatttagtct caaatttccc agcctggttt 7620 gaaaatctgg gctcccagcc ttcaataagg aggactacag atatgtacga ctgagccttg attccagcct catgtttata cgtctgtgct cagctccctg aaggttccag tttgaaactc 7680 aataatccag gggtcagaaa gtcttgatct tatccccaca gtatggcacc aagcctggct 7740 7800 gagcettetg acttagtetg ceetgttget atttaageae ttttetteae taggetaaaa 7860 ataaaaggag cttcctcctt tgccatggcg ctgtgcatga taggaaaagg tagctatcta ctagcatatt aactccactg tttttgcttt gtgtgtttgg tttttgagga agggtctcaa 7920 ctgtgtatcc ctggctggcc tggccggatc tagcttcgtg tcaaggacgg tgaggcgcgc 7980 8040 caatattggc tattggccat tgcatacgtt gtatccatat cataatatgt acatttatat 8100 tggctcatgt ccaacattac cgccatgttg acattgatta ttgactagtt attaatagta atcaattacg gggtcattag ttcatagccc atatatggag ttccgcgtta cataacttac 8160 8220 ggtaaatggc ccgcctggct gaccgcccaa cgacccccgc ccattgacgt caataatgac 8280 gtatgttccc atagtaacgc caatagggac tttccattga cgtcaatggg tggagtattt 8340 acggtaaact gcccacttgg cagtacatca agtgtatcat atgccaagta cgccccctat 8400 tgacgtcaat gacggtaaat ggcccgcctg gcattatgcc cagtacatga ccttatggga 8460 ctttcctact tggcagtaca tctacgtatt agtcatcgct attaccatgg tgatgcggtt ttggcagtac atcaatgggc gtggatagcg gtttgactca cggggatttc caagtctcca 8520 ccccattgac gtcaatggga gtttgttttg gcaccaaaat caacgggact ttccaaaatg 8580 tcgtaacaac tccgcccat tgacgcaaat gggcggtagg cgtgtacggt gggaggtcta 8640

tataagcaga gctcgtttag tgaaccgtca gatcgcctgg agacgccatc cacgctgttt 8700 tgacctccat agaagacacc gggaccgatc cagcctccgc ggccgggaac ggtgcattgg 8760 aacgcggatt ccccgtgcca agagtgacgt aagtaccgcc tatagagtct ataggcccac 8820 ccccttggct tcttatgcat gctatactgt ttttggcttg gggtctatac acccccgctt 8880 cctcatgtta taggtgatgg tatagcttag cctataggtg tgggttattg accattattg 8940 accactecce tattggtgac gatactttcc attactaatc cataacatgg ctctttgcca 9000 caactctctt tattggctat atgccaatac actgtccttc agagactgac acggactctg 9060 tatttttaca ggatggggtc tcatttatta tttacaaatt cacatataca acaccaccgt 9120 ccccagtgcc cgcagttttt attaaacata acgtgggatc tccacgcgaa tctcgggtac 9180 gtgttccgga catgggctct tctccggtag cggcggagct tctacatccg agccctgctc 9240 ccatgcctcc agcgactcat ggtcgctcgg cagctccttg ctcctaacag tggaggccag 9300 acttaggcac agcacgatgc ccaccaccac cagtgtgccg cacaaggccg tggcggtagg 9360 gtatgtgtct gaaaatgagc tcggggagcg ggcttgcacc gctgacgcat ttggaagact 9420 taaggcagcg gcagaagaag atgcaggcag ctgagttgtt gtgttctgat aagagtcaga 9480 ggtaactccc gttgcggtgc tgttaacggt ggagggcagt gtagtctgag cagtactcgt 9540 tgctgccgcg cgcgccacca gacataatag ctgacagact aacagactgt tcctttccat 9600 9660 gggtcttttc tgcagtcacc gtccttgaca cgaagcttgc cgccaccatg gtgagcaagc agateetgaa gaacaeegge etgeaggaga teatgagett caaggtgaac etggagggeg 9720 tggtgaacaa ccacgtgttc accatggagg gctgcggcaa gggcaacatc ctgttcggca 9780 accagetggt geagateege gtgaceaagg gegeeeeet geeettegee ttegacatee 9840 9900 tgagccccgc cttccagtac ggcaaccgca ccttcaccaa gtaccccgag gacatcagcg acttetteat ccagagette ecegeegget tegtgtaega gegeaceetg egetaegagg 9960 acggcggcct ggtggagatc cgcagcgaca tcaacctgat cgaggagatg ttcgtgtacc 10020 gcgtggagta caagggccgc aacttcccca acgacggccc cgtgatgaag aagaccatca 10080 ccggcctgca gcccagcttc gaggtggtgt acatgaacga cggcgtgctg gtgggccagg 10140 tgatcctggt gtaccgcctg aacagcggca agttctacag ctgccacatg cgcaccctga 10200 tgaagagcaa gggcgtggtg aaggacttcc ccgagtacca cttcatccag caccgcctgg 10260 agaagaccta cgtggaggac ggcggcttcg tggagcagca cgagaccgcc atcgcccagc 10320 tgaccagcct gggcaagcc ctgggcagcc tgcacgagtg ggtgtaata 10369

<211> 13535

<212> DNA

<213> Hamster sp.

<220>

<221> misc_feature

<223> Seq. ID. No. 1: circular plasmid GS + IgG 2A hot spot targetting
 vector pEE 15.1 hCMVp-GFP /clone 11

<400> 4 gaattcattg atcataatca gccataccac atttgtagag gttttacttg ctttaaaaaa 60 120 cctcccacac ctcccctga acctgaaaca taaaatgaat gcaattgttg ttgttaactt 180 gtttattgca gcttataatg gttacaaata aagcaatagc atcacaaatt tcacaaataa 240 agcatttttt tcactgcatt ctagttgtgg tttgtccaaa ctcatcaatg tatcttatca tgtctggcgg ccgcgacctg caggcgcaga actggtaggt atggaagatc cctcgagatc 300 360 cattgtgctg gcggtaggcg agcagcgcct gcctgaagct gcgggcattc ccagtcagaa atgagegeca gtegtegteg geteteggea eegaagtget atgattetee geeageatgg 420 cttcggccag tgcgtcgagc agcgcccgct tgttcctgaa gtgccagtaa agcgccggct 480 gctgaacccc caaccgttcc gccagtttgc gtgtcgtcag accgtctacg ccgacctcgt 540 600 tcaacaggtc tagggcggca cggatcactg tattcggctg caactttgtc atgcttgaca ctttatcact gataaacata atatgtccac caacttatca gtgataaaga atccgcgcca 660 qcacaatqqa tctcgaggtc gagggatctc tagaggatcc atattcgcga atatgccggc 720 780 atcaccggcg ccacaggtgc ggttgctggc gcctatatcg ccgacatcac cgatggggaa gategggete gecaettegg geteatgage gettgttteg gegtgggtat ggtggeagge 840 ccgtqqccgg gggactgttg ggcgccatct ccttgcatgc accattcctt gcggcggcgg 900 tgctcaacgg cctcaaccta ctactgggct gcttcctaat gcaggagtcg cataagggag 960 1020 agcgtcgagt cctccgtgtt cgaagcgatc cctgtccagt ggtgtgcaca ccttcccagc 1080 tgtcctgcag tctgacctct acaccctcag cagctcagtg actgtaacct cgagcacctg 1140 gcccagccag tccatcacct gcaatgtggc ccacccggca agcagcacca aggtggacaa 1200 gaaaattggt gaggaaaaca aggggagtag aggttcacaa gtgattagtc taaggcctta gcctagctag accagccagg atcagcagcc atcaccaaaa atgggaactt ggcccagaag 1260 agaaggagat actgactgtg actccctctt ggaaacttct aactatgacc acctaccttc 1320 aaggtcatga tcctctagga tagatgtcct tggtcatttc caggatcatc ctgacctaag 1380

gccataccca gggacaaagt ccctggtttg gtgccttttc tccttcaaac ttgagtaacc 1440 cccagccttc tctctgcaga gcccagaggg cccacaatca agccctgtcc tccatgcaaa 1500 1560 tgcccaggta agtcactaga ccagagctcc acccgggaga atggtaagtg ctgtaaacat ccctgcacta gaggataagc catgtacaga tccatttcca tctctcctca tcagcaccta 1620 acctettggg tggaccatec gtetteatet teeeteeaaa gateaaggat gtaeteatga 1680 1740 tctccctgag ccccatagtc acatgtgtgg tggtggatgt gagcgaggat gacccagatg tccagatcag ctggtttgtg aacaacgtgg aagtacacac agctcagaca caaacccata 1800 1860 gagaggatta caacagtact ctccgggtgg tcagtgccct ccccatccag caccaggact 1920 ggatgagtgg caaggagttc aaatgcaagg tcaacaacaa agacctccca gcgcccatcg 1980 agagaaccat ctcaaaaccc aaaggtgaga gctgcagcct gactgcatgg gggctgggat gggcataagg ataaaggtct gtgtggacag ccttctgctt cagccatgac ctttgtgtat 2040 gtttctaccc tcacagggtc agtaagagct ccacaggtat atgtcttgcc tccaccagaa 2100 2160 gaagagatga ctaagaaaca ggtcactctg acctgcatgg tcacagactt catgcctgaa 2220 gacatttacg tggagtggac caacaacggg aaaacagagc taaactacaa gaacactgaa ccagtcctgg actctgatgg ttcttacttc atgtacagca agctgagagt ggaaaagaag 2280 aactgggtgg aaagaaatag ctactcctgt tcagtggtcc acgagggtct gcacaatcac 2340 2400 cacacgacta agagettete ceggacteeg ggtaaatgag eteageacee acaaaactet caggtccaaa gagacaccca cactcatctc catgcttccc ttgtataaat aaagcaccca 2460 ccaatgcctg ggaccatgta aaactgtcct ggttctttcc aaggtataga gcatagctca 2520 2580 caggctgata tttctggcca gggttggagg acagccttgt ctataggaag agaatgaggt ttttgcactg caggactcag agetcattag ttateetgee ttggagtgtt ggggettgge 2640 2700 tttaggcagt gccttttcct tgccttccta cgaaccagca gctgccatac atagagataa tcctaggaag cctcaaatgg agaaggacac aaacccacct ccctcaggct gttcctctat 2760 2820 cccggcccca cttctttacc taggggtttc tctgagtcta ttgtggagtt acacatggcc 2880 aggggcattc cagagaccct tgtcatccat acactcaact caggcagctt tgcacaaaca aagtotgcac accoatacag atggctcact cttgcctgtg ccatgtaggg ctgaggcaca 2940 tggctcttgc tgccccaagg gagggactat tagatagcca cactcatgct gaatcctggc 3000 ccattcaaat tagcctgctg aacaccatcc agtccatata gcacatgtat ccacatgcac 3060 gtgtgcacaa aacgcattta atacactggg acaacaattc tgtgccctgc acagcaccta 3120 tatccagcaa tgtatcacca tacacacgac caaaaaaaatt caatgcccac gtttctgcca, 3180 tcacaaacag acacatettt cetetetgtg gecaetgeat tatatgetea acacaagace 3240

3300 tctgaagcca gatccatctc tggcacctcg gggtcatgct tcaaccccac atgaattatg 3360 caaaccatag ccataatggt ctgaatcact tcacactggg atgttcccaa gttcaggcaa gacgagccac aggctctgct gatgactgaa ggacagcaaa gggtcagtcc agctgtatag 3420 3480 ccactgttga cctgggtcac aggccctgct gaccctccac cttctcctgt actgaaggaa 3540 tgaaagatga gacaagcata gagggcactt gaataatcca ggtcactctg aggtccaccc aaggcattat tggactcagg tgggaagctg agactggtgt cccagaggga aaggaaggaa 3600 3660 agcaggecec ggggagggte tgetgtecea gteaggetgg agatetetee tetgaateea 3720 tgcagacatg tctgcctcac agggaatctc tcccagcacc aaccatgttg ggacaaacac tgactgtcct ctctgttcag ggctagacct ggatgatgtc tgtgctgagg cccaggacgg 3780 ggagctggac ggcctctgga cgaccatcac catcttcatc agcctcttcc tgctcagcgt 3840 3900 gtgctacagc gcctctgtca cactcttcaa ggttggcact gtctcccacc ctctgctgtg 3960 atggctacac tgaccacaaa atgtcctctc actcctcccc agatgtagta ggacgttact ttgctgcccc tactctgtcc cacacaccat ttcctccatt ccctgagcca tcccacattg 4020 4080 ttctatgtga ctccacattg tgtcccatac agtctgccct tctgtctctc tggctgtcct 4140 gcgtgatcct gatactgtct tatgagacca aacctccttg cattccacac tagccttcat 4200 gaggttcaat gctgtcttac acacaatccc ctcagcctca ccatggctca aggtactctg tgagctatcc tcataccatc tccacctcaa ctcccacaat atctccactc tgacccctcc 4260 4320 catacccagt ctcctacctg tatgaaggga attgaaggag agacaggtcg acctctgtct ttcccacaga ttggagggtc tgagcatggg cgtggtctct gactttctct cacttcccca 4380 4440 caggtaaagt ggatcttctc ctctgtggtg gagctgaagc agacgatctc ccctgactac 4500 agaaacatga ttgggcaggg agcctaggcc acttcctctg ggatcagaag agcttcctag 4560 gccctgcaga agcccatcca tcctactgtg cagcctaaca gggaggccac actctagccc 4620 tatgactoto tgatcagaac toccatggto toototttgg aggaccaogt gcagtgcagg 4680 ctttgcccag acctaaacac ttccacagca gtcgccagat atctaactac tccggaccag aagaaccatc tccttccaaa ccagcactag ggatctgaga tctcagaatg tttgcctaag aagagetgga aatecagget teetgtgtte tgetacaagg acateageet ggatttgace tggaccacac attttcatct aaatgagttt tccacaaagg acacgtttca gatccttgaa 4860 tgagacetet acatggaaga ecagagteae tatacecaaa ggteaetetg tateettgea ccagctatac tggacagctt ccttcctggt acttcagtga ccctggctga ggaaaggatc tgtgacctca actgtttgga gagcctctgg aagatgtagt cttctcttcc tgctaccacc aacatgctgg atctcagatg cagaatccaa tccacagaca ccactgacca cacaacctga agacaaggcc attgccacct ccacagagat gccatccaca ctctgtggag aaataaggag

4740

4800

4920

4980

5040

5100

5160

5220 tgctttgtgc agcctctgca aagctctggc agggattaga gtatacacac tgagtactga ctaggtgacc aggcagaaaa acctccagga gaaggaacaa tgggggagag atgtgaacag 5280 5340 atagttagaa aaagcatggt gtcacaggtc tgctctgtgg actgatttcc agattggacc acctacagca gaaaccatcg gttgcagtgg caatctagga ggaccaacct ggaataggag 5400 ggctgctgtg gtcaatggag agtagacctg tatctatttc tccactgcct cttatgacca 5460 5520 5580 gaaagagaga gagagagag gagagagaga gaggaaggaa ggaaggaagg aaggaaggaa 5640 ggaaggaagg aggaggagga gaggaggaga gagagagaga gagagagaga gagagagaga gagcaccagc ttttctgtga ctggaaggaa atgcttagag agcttggatc 5700 tttaaagett ettttteta gagaecatga atgtetttgt tetetetete tetetetete 5760 5820 tgcatgcacg ctattgtttt ggcatttgaa acaataaaac attcttttaa tattctgtat 5880 ctcatggttc cccttctgtg tggatcagcc ctaacaccca ggaacagggg acaataaaca 5940 6000 gaccacagec atgtacagec ttetacetec ettetggtte tgacetecca gaggteeete agtgggcccc tcacagctgg gtttcttccc tggcagtgcc accaagagct caggcacctc 6060 6120 tgagctggag gctgtcctga tgccataggc aggctatgga gcagagatga tgaccacggt 6180 ggactccagg tgagccaggc aaagcctccc atgccagaag agaagcgtgt ggtactcact ggcctcgggc tgctacggat tcagcaaaga gcatggatcg cttcgaagcc tccaagctcg 6240 6300 acctegggce gegttgetgg egttttteca taggeteege eeceetgaeg ageateacaa aaatcqacqc tcaaqtcaqa ggtggcgaaa cccgacagga ctataaagat accaggcgtt 6360 6420 tecceetgga ageteceteg tgegetetee tgtteegace etgeegetta eeggataeet gtccgccttt ctcccttcgg gaagcgtggc gctttctcaa tgctcacgct gtaggtatct 6480 6540 cagtteggtg taggtegtte getecaaget gggetgtgtg caegaacece cegtteagee 6600 cgaccgctgc gccttatccg gtaactatcg tcttgagtcc aacccggtaa gacacgactt ategecactg geageageca etggtaacag gattageaga gegaggtatg taggeggtge 6660 6720 tacagagttc ttgaagtggt ggcctaacta cggctacact agaaggacag tatttggtat ctgcgctctg ctgaagccag ttaccttcgg aaaaagagtt ggtagctctt gatccggcaa 6780 6840 acaaaccacc gctggtagcg gtggtttttt tgtttgcaag cagcagatta cgcgcagaaa aaaaggatct caagaagatc ctttgatctt ttctacgggg tctgacgctc agtggaacga 6900 6960 aaactcacgt taagggattt tggtcatgag attatcaaaa aggatcttca cctagatcct tttaaattaa aaatgaagtt ttaaatcaat ctaaagtata tatgagtaaa cttggtctga 7020

7080 cagttaccaa tgcttaatca gtgaggcacc tatctcagcg atctgtctat ttcgttcatc 7140 catagttgcc tgactcccg tcgtgtagat aactacgata cgggagggct taccatctgg 7200 ccccagtgct gcaatgatac cgcgagaccc acgctcaccg gctccagatt tatcagcaat aaaccagcca gccggaaggg ccgagcgcag aagtggtcct gcaactttat ccgcctccat 7260 7320 ccagtctatt aattgttgcc gggaagctag agtaagtagt tcgccagtta atagtttgcg caacgttgtt gccattgcta caggcatcgt ggtgtcacgc tcgtcgtttg gtatggcttc 7380 7440 attcagctcc ggttcccaac gatcaaggcg agttacatga tcccccatgt tgtgcaaaaa 7500 aggggttagc tectteggte etcegategt tgteagaagt aagttggeeg eagtgttate actcatggtt atggcagcac tgcataattc tcttactgtc atgccatccg taagatgctt 7560 7620 ttctgtgact ggtgagtact caaccaagtc attctgagaa tagtgtatgc ggcgaccgag 7680 ttgctcttgc ccggcgtcaa cacgggataa taccgcgcca catagcagaa ctttaaaagt 7740 gctcatcatt ggaaaacgtt cttcggggcg aaaactctca aggatcttac cgctgttgag 7800 atccagttcg atgtaaccca ctcgtgcacc caactgatct tcagcatctt ttactttcac 7860 cagcgtttct gggtgagcaa aaacaggaag gcaaaatgcc gcaaaaaagg gaataagggc 7920 gacacggaaa tgttgaatac tcatactctt cctttttcaa tattattgaa gcatttatca gggttattgt ctcatgagcg gatacatatt tgaatgtatt tagaaaaata aacaaatagg 7980 ggttccgcgc acatttcccc gaaaagtgcc acctgacgtc taagaaacca ttattatcat 8040 8100 gacattaacc tataaaaata ggcgtatcac gaggccctga tggctctttg cggcacccat 8160 cgttcgtaat gttccgtggc accgaggaca accctcaaga gaaaatgtaa tcacactggc 8220 tcaccttcgg gtgggccttt ctgcgtttat aaggagacac tttatgttta agaaggttgg taaattcctt gcggctttgg cagccaagct agagatccgg ctgtggaatg tgtgtcagtt 8280 agggtgtgga aagtccccag gctccccagc aggcagaagt atgcaaagca tgcatctcaa 8340 ttagtcagca accaggtgtg gaaagtcccc aggctcccca gcaggcagaa gtatgcaaag 8400 catgcatctc aattagtcag caaccatagt cccgccccta actccgccca tcccgcccct 8460 8520 aactccgccc agttccgccc attctccgcc ccatggctga ctaatttttt ttatttatgc 8580 agaggccgag gccgcctcgg cctctgagct attccagaag tagtgaggag gcttttttgg 8640 aggectagge ttttgcaaaa agetagettg gggccacege teagageace ttccaccatg 8700 gccacctcag caagttccca cttgaacaaa aacatcaagc aaatgtactt gtgcctgccc 8760 cagggtgaga aagtccaagc catgtatatc tgggttgatg gtactggaga aggactgcgc 8820 tgcaaaaccc gcaccctgga ctgtgagccc aagtgtgtag aagagttacc tgagtggaat tttgatggct ctagtacctt tcagtctgag ggctccaaca gtgacatgta tctcagccct 8880 gttgccatgt ttcgggaccc cttccgcaga gatcccaaca agctggtgtt ctgtgaagtt 8940

ttcaagtaca accggaagcc tgcagagacc aatttaaggc actcgtgtaa acggataatg 9000 9060 gacatggtga gcaaccagca cccctggttt ggaatggaac aggagtatac tctgatggga acagatgggc accettttgg ttggcettee aatggettte ctgggeecea aggteegtat 9120 tactgtggtg tgggcgcaga caaagcctat ggcagggata tcgtggaggc tcactaccgc 9180 9240 gcctgcttgt atgctggggt caagattaca ggaacaaatg ctgaggtcat gcctgcccag 9300 tgggaactcc aaataggacc ctgtgaagga atccgcatgg gagatcatct ctgggtggcc 9360 cgtttcatct tgcatcgagt atgtgaagac tttggggtaa tagcaacctt tgaccccaag cccattcctg ggaactggaa tggtgcaggc tgccatacca actttagcac caaggccatg 9420 cgggaggaga atggtctgaa gcacatcgag gaggccatcg agaaactaag caagcggcac 9480 9540 cggtaccaca ttcgagccta cgatcccaag gggggcctgg acaatgcccg tggtctgact 9600 gggttccacg aaacgtccaa catcaacgac ttttctgctg gtgtcgccaa tcgcagtgcc agcatccgca ttccccggac tgtcggccag gagaagaaag gttactttga agaccgcggc 9660 9720 ccctctgcca attgtgaccc ctttgcagtg acagaagcca tcgtccgcac atgccttctc aatgagactg gcgacgagcc cttccaatac aaaaactaat tagactttga gtgatcttga 9780 gcctttccta gttcatccca ccccgcccca gagagatctt tgtgaaggaa ccttacttct 9840 9900 gtggtgtgac ataattggac aaactaccta cagagattta aagctctaag gtaaatataa 9960 aatttttaag tgtataatgt gttaaactac tgattctaat tgtttgtgta ttttagattc caacctatgg aactgatgaa tgggagcagt ggtggaatgc ctttaatgag gaaaacctgt 10020 tttgctcaga agaaatgcca tctagtgatg atgaggctac tgctgactct caacattcta 10080 ctcctccaaa aaagaagaga aaggtagaag accccaagga ctttccttca gaattgctaa 10140 10200 10260 caaaggaaaa agctgcactg ctatacaaga aaattatgga aaaatattct gtaaccttta taagtaggca taacagttat aatcataaca tactgttttt tcttactcca cacaggcata 10320 gagtgtctgc tattaataac tatgctcaaa aattgtgtac ctttagcttt ttaatttgta 10380 aaggggttaa taaggaatat ttgatgtata gtgccttgac tagagatcat aatcagccat 10440 accacatttg tagaggtttt acttgcttta aaaaacctcc cacacctccc cctgaacctg 10500 aaacataaaa tgaatgcaat tgttgttgtt aacttgttta ttgcagctta taatggttac 10560 aaataaagca atagcatcac aaatttcaca aataaagcat ttttttcact gcattctagt 10620 10680 tgtggtttgt ccaaactcat caatgtatct tatcatgtct ggatctctag cttcgtgtca aggacggtga ctgcagtgaa taataaaatg tgtgtttgtc cgaaatacgc gttttgagat 10740 ttctgtcgcc gactaaattc atgtcgcgcg atagtggtgt ttatcgccga tagagatggc 10800 gatattggaa aaatcgatat ttgaaaatat ggcatattga aaatgtcgcc gatgtgagtt 10920 tctgtgtaac tgatatcgcc atttttccaa aagtgatttt tgggcatacg cgatatctgg cgatagcgct tatatcgttt acgggggatg gcgatagacg actttggtga cttgggcgat 10980 tctgtgtgtc gcaaatatcg cagtttcgat ataggtgaca gacgatatga ggctatatcg 11040 11100 ccgatagagg cgacatcaag ctggcacatg gccaatgcat atcgatctat acattgaatc aatattggcc attagccata ttattcattg gttatatagc ataaatcaat attggctatt 11160 ggccattgca tacgttgtat ccatatcata atatgtacat ttatattggc tcatgtccaa 11220 11280 cattaccgcc atgttgacat tgattattga ctagttatta atagtaatca attacggggt cattagttca tagcccatat atggagttcc gcgttacata acttacggta aatggcccgc 11340 ctggctgacc gcccaacgac ccccgcccat tgacgtcaat aatgacgtat gttcccatag 11400 taacgccaat agggactttc cattgacgtc aatgggtgga gtatttacgg taaactgccc 11460 acttggcagt acatcaagtg tatcatatgc caagtacgcc ccctattgac gtcaatgacg 11520 gtaaatggcc cgcctggcat tatgcccagt acatgacctt atgggacttt cctacttggc 11580 agtacatcta cgtattagtc atcgctatta ccatggtgat gcggttttgg cagtacatca 11640 atgggcgtgg atagcggttt gactcacggg gatttccaag tetecacece attgacgtca 11700 atgggagttt gttttggcac caaaatcaac gggactttcc aaaatgtcgt aacaactccg 11760 ccccattgac gcaaatgggc ggtaggcgtg tacggtggga ggtctatata agcagagctc 11820 gtttagtgaa ccgtcagatc gcctggagac gccatccacg ctgttttgac ctccatagaa 11880 gacaccggga ccgatccagc ctccgcggcc gggaacggtg cattggaacg cggattcccc 11940 12000 gtgccaagag tgacgtaagt accgcctata gagtctatag gcccaccccc ttggcttctt atgcatgcta tactgttttt ggcttggggt ctatacaccc ccgcttcctc atgttatagg 12060 tgatggtata gcttagccta taggtgtggg ttattgacca ttattgacca ctcccctatt 12120 ggtgacgata ctttccatta ctaatccata acatggctct ttgccacaac tctctttatt 12180 ggctatatgc caatacactg tccttcagag actgacacgg actctgtatt tttacaggat 12240 ggggtctcat ttattattta caaattcaca tatacaacac caccgtcccc agtgcccgca 12300 gtttttatta aacataacgt gggatctcca cgcgaatctc gggtacgtgt tccggacatg 12360 ggctcttctc cggtagcggc ggagcttcta catccgagcc ctgctcccat gcctccagcg 12420 actcatggtc gctcggcagc tccttgctcc taacagtgga ggccagactt aggcacagca 12480 12540 cgatgcccac caccaccagt gtgccgcaca aggccgtggc ggtagggtat gtgtctgaaa 12600 atgagetegg ggageggget tgeacegetg acgeatttgg aagaettaag geageggeag aagaagatgc aggcagctga gttgttgtgt tctgataaga gtcagaggta actcccgttg 12660 12720 cggtgctgtt aacggtggag ggcagtgtag tctgagcagt actcgttgct gccgcgcgc

ccaccagaca taatagctga cagactaaca gactgttcct ttccatgggt cttttctgca 12780 12840 gtcaccgtcc ttgacacgaa gcttgccgcc accatggtga gcaagcagat cctgaagaac 12900 ,, accggcctgc aggagatcat gagcttcaag gtgaacctgg agggcgtggt gaacaaccac 12960 gtgttcacca tggagggctg cggcaagggc aacatcctgt tcggcaacca gctggtgcag 13020 atcogcgtga ccaagggege eccettgece ttegeetteg acateetgag eccegeette 13080 cagtacggca accgcacctt caccaagtac cccgaggaca tcagcgactt cttcatccag agetteeceg eeggettegt gtaegagege accetgeget aegaggaegg eggeetggtg 13140 gagatccgca gcgacatcaa cctgatcgag gagatgttcg tgtaccgcgt ggagtacaag 13200 ggccgcaact tccccaacga cggccccgtg atgaagaaga ccatcaccgg cctgcagccc 13260 13320 agettegagg tggtgtacat gaacgacgge gtgetggtgg gecaggtgat cetggtgtac 13380 cgcctgaaca gcggcaagtt ctacagctgc cacatgcgca ccctgatgaa gagcaagggc gtggtgaagg acttececga gtaccaette atccagcaec geetggagaa gacctaegtg 13440 13500 gaggacggcg gcttcgtgga gcagcacgag accgccatcg cccagctgac cagcctgggc 13535 aagcccctgg gcagcctgca cgagtgggtg taata